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DIRECTIONS
FOR
COLLECTING AND PRESERVING OBJECTS
OF
NATURAL HISTORY,

ISSUED BY THE

MARYLAND ACADEMY OF SCIENCE AND LITERATURE,

BY

WM. EDW. COALE, M.D. JACOB H. QUIMBY & HENRY R. HAZLEHURST,

COMMITTEE FROM THE SECTION OF ZOOLOGY.

QUADRUPEDS.

In preparing quadrupeds the object in view is to preserve the skin entire, with the other parts that characterize the species—such as the head with the jaws and teeth—the legs with the hoofs and claws.

For this purpose an incision should be made along the middle of the belly, commencing a little below the space between the fore legs and ending at three-fourths the distance between that and the root of the tail. The skin is then dissected up on each side as far as the legs, which must be disjointed from the body. The neck must be drawn out and cut off close to the skull, over which the skin must be stripped. All the soft parts are then to be removed from the skull, both externally and internally, such as the muscles of the jaw—the eyes—the tongue and the brain. The legs are to be drawn out as far as possible and cleaned in a similar manner: each as well as the skull being again returned into the skin, to insure the preservation of which every portion of flesh or fat must be entirely removed from it. The skin must then be well rubbed in every part with the white oxide of arsenic, a portion of which should also be thrown into the cavities of the skull and the sockets of the eyes. If the arsenic cannot be procured, corrosive sublimate in solution (3 oz. to a gallon of spirit) may be substituted. Small animals may be preserved in spirits of wine.

For transportation, the skin, if practicable should be lined with thick paper—the body folded flat—the legs turned inwards across the body—and the whole rolled up, commencing at the head. If the animal be not larger than a cat, it would be far preferable to merely lay the legs across, and pack the skins one upon the other, as this would tend to prevent any distortion, which should in all cases be carefully avoided. When the fur is very thick or many skins are packed together, the arsenic in the skin is not always a safeguard against insects, as a precaution in such cases, powdered camphor may be sprinkled between them.

It is well here to mention that there are certain necessary precautions to be observed under this as well as under the succeeding heads. The animal selected, if there is a choice, should be well developed—of an adult age (the young also when the age is known are useful,) should have all the parts which furnish characteristics to the species perfect, the skin free from abrasions and from spots of blood and dirt. These last may with care be removed, and if the animal be a scarce one and it be desirable on that account to preserve it, some of these defects may be remedied by artificial means.

BIRDS.

The last paragraph though applicable to all animals, is peculiarly so to birds. These should be preserved in full plumage, and having the feathers of the wings and tail as perfect as possible.*

Taking hold of the feet of the bird and permitting the head to hang downward, gently compress the abdomen and neck, so as to empty the stomach and craw of any fluid matter they may contain, and then fill the throat with cotton. Separate the feathers of the abdomen carefully along the middle of the body and commencing a little above the lower edge of the breast-bone, make an incision large enough to take the body out, which by practice may be accomplished through a very small opening, which is preferable. In making the incision it must be remembered that the skin of birds is generally very thin, and care should be taken not to penetrate the muscles of the abdomen or viscera. The incisions may also be made under one of the wings, which is thought by many to be a much more convenient place, and it is certainly better concealed than in the former. The skinning is continued to the legs, which must be disjointed from the body, and to the tail, the bone of which must be cut off, carefully cleansed and left attached to the skin. The body can now be drawn out so as to get readily at the wings, which are also to be disjointed. The neck is then drawn out and the skinning continued to the root of the bill. The eyes as well as all the soft parts of the head are next to be cleaned, taking care not to burst the former which would discharge the fluid they contain and injure the feathers. The neck is cut off close to the head, which is then drawn back into its natural position. This latter object is sometimes difficult to accomplish in birds having long slender necks unless a string of sufficient length be first attached to the bill, by which the head can readily be drawn back. In birds having large crests as this process is impossible without injuring them, an incision must be made in the back of the neck, and the head cleaned by that means. The bones of the wings and legs are next to be freed from the flesh, and the whole skin and skull, &c. &c. rubbed with arsenic as previously directed. In cleaning the bones of the wings of large birds it is generally difficult to draw them out of the skin, when this is the case an incision must be made along the under part of the wing, for the purpose of removing the flesh. The bird must lastly be filled with tow or raw cotton, inserting it with fine pincers into the neck and sockets of the eye, &c. The wings are then folded, the neck, legs and tail extended, the feathers smoothed and laid straight or washed with warm soap and water if necessary, and the bird dried.

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*In shooting birds for the purpose of stuffing them, very small shot should be used, and in very small loads. A quantity of cotton should be provided to fill both the throat and the wound. The latter if very small may be dusted with powdered rosin or chalk, which will absorb the blood and prevent its soiling the plumage. Each specimen ought to be separately wrapped in soft paper and deposited in a basket, as the usual game bag is very liable to break the feathers and distort the bird.

When dried they can easily be packed, rolling each in a separate piece of paper and sprinkling powdered camphor in the box.

It is desirable to have both male and female with the nest and eggs, and also the young ones when the age can with certainty be told. It is also well to know at what season of the year the specimen was killed, as many birds change their plumage during the course of the year. Eggs are preserved by making a small hole at each end and blowing out the contents.

REPTILES.

Small snakes, lizards, frogs, &c. are best preserved in spirits. Large snakes and lizards are most conveniently transported in spirits, but may afterwards be stuffed.*

With tortoises the skin should be separated from the lower shell all around, and the shells sawed apart each side; the skinning and stuffing is then easily effected. The upper shell should be slightly oiled but not varnished.

FISH.

Are most readily prepared for transportation by simply wrapping each specimen in muslin and putting them in spirits, taking care not to pack them in such a manner as to distort their shape. A piece of sheet lead may be attached to each, having a number stamped upon it, as a reference to any written remarks which may accompany it.

In stuffing those fish which have no scales, a slit may be made in the belly, and with a little dexterity the head and tail may be successively drawn out, taking care to preserve the head, gills, fins and tail. The skin can then be filled according to its size with bran, saw-dust, tow, cotton or straw. The fins and tail must each be spread out on a piece of card or thin board until dry, and the same precautions in preserving the skin from attacks of insects used as before.

Fish having scales should be skinned by making an incision along *one side* of sufficient length, and the body removed carefully so as not to bend or wrinkle the skin of the other side, which would deprive it of its scales. The incision, if the skin is sufficiently strong may be sewed up, or if not, may be closed by pasting a piece of bladder or muslin over it, which, as but one side is intended for exhibition will not disfigure the specimen.

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*In the collection of the Maryland Academy, the snakes and small lizards are, at the suggestion of Dr. William Ed. Coale, enclosed in glass tubes filled with spirit and hermetically sealed at each end. In this way the specimens have a very neat appearance, besides which the minute characteristics of the species, the length, number and shape of the scales, &c. &c. can be more readily studied, and there is of course no evaporation of the spirit.

INSECTS.

Hard shelled insects, such as beetles, as well as flies, grasshoppers, &c. merely require to be pierced with a pin through the right *elytron* or wing case, and stuck in a box. Butterflies should be caught with a net in such a manner as not to deprive the wings of the down which covers them. In preserving them, two specimens are desirable so as to exhibit both surfaces of the wings, which should be kept extended.

When insects are preserved in a box the sides should be plentifully daubed with turpentine and a large lump of camphor be put into each box. As another precaution, a quantity of arsenic may be mixed with the turpentine.

Spiders, centipedes, worms, and all soft insects are best preserved in spirits.

SHELLS.*

Shells may be collected in great plenty and variety on the shores of most continents and islands; but after having lain there for any considerable time divested of the animal, they become broken and lose their colour, and of course are less valuable; choose therefore only such as are complete of their kind, and not corroded by worms; which are generally those having the live animals in them, or those recently thrown upon the shore by the sea. The animals may be killed by putting them into boiling water, after which each must be extracted from its shell, unless very small, reserving its operculum or cover which closes up the mouth: this, however, does not exist in every species. The shells, especially those from the sea, should then be soaked in fresh water, afterwards well dried; then wrapped up carefully in soft paper or bran, and packed in a box, leaving no room for shaking. Many kinds of shells live out at sea, and never approach the shores; others fix themselves to the bottoms of ships, old timber, turtles, &c. These are generally the most rare and valuable, and may be procured by trailing, or with scoop-nets, among the rubbish, sea weeds, &c. that are frequently found floating on the ocean.

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* The three following articles on shells, starfish and sea eggs, as well as on minerals and all that follows, are copied from the instructions issued by the Philadelphia Academy of Sciences, which have also been liberally used throughout.

Rivers of all countries abound in *fresh water shells:* these are much sought after, and are easily taken. Their preservation requires the same process in all respects as sea shells.

The same remarks will apply equally well to *land shells,* of which varieties are found almost every where.

Of bivalves, or those having two shells, it is important to obtain both valves. The natural skin peculiar to many kinds of shells, should not on any account be taken off, but may be kept in its natural state by being rubbed with a little oil; nor should the shells be touched with acids, as they are spoiled by them. It is also desirable to have a shell of each species, *containing the animal,* which may be kept in spirits.

Corals, sea-fans, &c. may be simply washed in fresh water and dried in the shade.

STAR-FISH.—(*Asterias.*)

Must be washed in fresh water, and dried in the shade.

SEA-EGGS.—(*Echinus.*)

Must be washed in fresh water, punctured around the mouth, which is beneath, with a pen-knife, dipped into a pretty strong solution of corrosive sublimate and spirits, dried in the shade, and packed in cotton or bran to protect the spines from being broken.

In addition to the specimens above enumerated, it is particularly desirable to have whole skeletons of different quadrupeds, birds, reptiles and fish, and if this is not practicable the skulls, *the pelvis* or haunch bones, the feet, specifying whether the fore or hind feet and the wings are valuable, and it frequently happens that an animal may be too much soiled or disfigured for stuffing, while some or all of these parts may be obtained from it. To clean the separate bones it is merely necessary that they should be boiled so as to soften the meat which is then readily scraped off, during which process care must be taken not to break off any delicate points of bone. In preserving whole skeletons, the skull and bones of the neck and tail as well as the *large* bones of the extremities may be prepared in the above manner, but the ribs and back bone should be cleaned as much as possible with a knife *only,* and not separated. A little arsenic rubbed upon them will prevent smell from the flesh remaining attached, and after they are received at the academy they can be further cleaned and mounted.

The stomach and intestines should be first emptied, and after putting arsenic into them be blown up, and varnished. The windpipe must be stuffed with wool or left attached to the tongue and preserved in spirits.

PLANTS.

1. The first direction to be given to the botanist is to *collect every thing*, even plants regarded as mere weeds. Those not higher than twelve inches should be preserved entire, branches and root; larger plants must be cut or in some cases doubled; and of plants still larger a specimen from parts bearing the flowers with some leaves from the stem or root, will be sufficient. Specimens of the most common height, habit and appearance, are to be selected, rejecting both dwarfs and monsters; while characteristic individuals constituting *varieties* should be collected. Generally plants should be gathered when the flowers are most perfectly developed, but some which soon shed their petals must be gathered when not fully expanded, that they may open by the time you are prepared to preserve them. Of the umbelliferous plants, the genus carex and some others whose seeds have distinguishing characteristics, specimens should also be gathered when their seeds are fully grown, but not so ripe as to fall. Also curious fruits may be dried by laying them in the sun, and afterwards kept in drawers with the cones of firs, &c.

2. The process of drying plants is simply this: place them between layers of ten or fifteen thicknesses of unsized paper, as old newspapers, place the pile between two boards and subject them to pressure, eight or ten bricks or a few large paving stones will be sufficient; or a lever press which keeps the pressure constant; are either of them preferable to a screw press. The papers must be changed for others perfectly dry, once or still better twice a day, until free from moisture; requiring from one to three days, and for some succulent plants as many weeks; while others may be removed from the parcel as they become dried. The plant must be spread out in its natural position, whether erect or drooping, whether the stem be straight or tortuous, and the parts placed so as to be as little confused as possible. Where leaves or flowers are very crowded, or where a number of stems arise from one point and interfere, some may be removed, so as to preserve and exhibit the remainder more perfectly. In very large and succulent stems it is sometimes necessary to pare off the

under half, or split them in two and press the halves separately, with their attached leaves, &c. Some flowers also as the thistle are hard and unyielding and require to be divided, and the parts pressed separately. To destroy the vegetating principle of some plants, which resists even the action of a powerful press, and to dry them more quickly they may be dipped into boiling water and wiped before being placed in the papers.

MINERALS, PETRIFACTIONS, &c.

Specimens of minerals may be collected in every soil, and are preserved with the greatest ease, nothing farther being requisite in general, than to detach masses from any rocks you may meet with, and put them by. Delicate specimens, such as crystals, or those procured from mines, should be protected from injury by wrapping each in a parcel of paper, tow, &c.

Petrifications of all kinds may be preserved in a similar manner: also specimens of the rocks composing canal districts, canal routes, mountains, or particular sections of country.

All other natural productions not particularized, will be valuable acquisitions to the academy, and in general are easily procured and preserved, and we would here recommend you not to be deterred from bringing any object from the circumstance of its being '*very common*;' but would rather advise you to preserve every natural curiosity that you may meet with, as particular characters which are interesting to the naturalist very frequently escape the notice of casual observers. Specimens the most common are particularly desirable from the western coast of America, and other countries little explored, and the most familiar productions of our own State, should there already be a sufficient number in possession of the academy, are very valuable as means of exchange for foreign specimens.

It is a material object, and the particular desire of the academy, that every information which can be gained respecting the specimens presented, should accompany them; as regards the climate, soil, locality, and other peculiarities.

The government of the United States having withdrawn all restrictions on the importation of objects of Natural History, there will be no difficulty at the custom-house.